REMARKS

Claim 2 has been amended in order to more particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Specifically speaking, Claim 2 has been amended to state that an inner circumferential surface of a guide hole of the flow guide is separated from an outer circumferential surface of an orifice which is continuous with the bearing of the solid die at a distance of 9-15 mm. Support for the limitation to Claim 2 can be found in Table 6 on page 31 of the present specification for Specimen No. 36 and in Example 1 of the present specification. No new matter has been added.

Claims 1, 2 and 4-6 have been rejected under 35 USC 103(a) as being unpatentable over JP 04-000353A (JP '353). Claims 1 and 4 also have been rejected under 35 USC 103(a) as being unpatentable over JP '353 in view of JP 2002-317255 (JP '255) or JP 2001-205329 (JP '329). Applicants respectfully traverse these grounds of rejection and urge reconsideration in light of the following comments.

The presently claimed invention is directed to a method of manufacturing a high-strength aluminum alloy extruded product which has excellent corrosion resistance and stress corrosion cracking resistance. The inventive method involves the steps of extruding a billet of a specified aluminum alloy containing specified component contents and which satisfy specified relationships, into a solid product through the use of a die having a bearing length of at least 0.5 mm and no greater than 5 times the thickness of the solid product to be extruded.

The present invention also is directed to a method of manufacturing a high-strength aluminum alloy extruded hollow product which has excellent corrosion resistance and stress corrosion cracking resistance. The method comprises the steps of extruding a billet of aluminum alloy having the composition as discussed above for the first embodiment into a hollow

product through the use of a porthole die or a bridge die in which the ratio of the flow speed of the aluminum alloy in a non-joining section with the flow speed of the aluminum alloy in a joining section in a chamber, where the billet reunites after entering at a port section of the die in divided flows and subsequently encircling a mandrel, is controlled at 1.5 or less.

The present invention provides a product having a fibrous structure accounting for at least 60% or more in area-fraction of the cross-sectional structure of the product. The instant invention was arrived at after conducting extensive studies regarding the relationship between the characteristics of the extruded product, the composition of the material used to form the extruded product and the dimensions of the die as well as various parts of flow guides, applicable when a product is extruded using a die alone or using a die together with a flow guide attached thereto. By using the aluminum alloy of the claimed composition and conducting the extrusion process under the requirements of the present claims, an extruded product is formed having a fibrous structure which accounts for 60% or more in area-fraction of the cross-sectional structure of the extruded product. The prior art cited by the Examiner does not disclose the presently claimed invention.

JP '353 discloses a process of increasing the strength of a worked product by subjecting an ingot of an aluminum-copper alloy containing specified weight percentages of copper, manganese, magnesium and silicon to specified treatment steps. The ingot is heated to a specified temperature rate at a specified rate of temperature increase and held for a specified time period. The ingot is then heated to another specified temperature range, held at this temperature for a specified time period and then cooled to a specified temperature at a specified cooling rate. Through these steps, the extinction of fiber structure attendant on the progress of recrystallization after aging treatment for an expanded aluminum-copper based aluminum alloy material can be

inhibited. As admitted by the Examiner, this reference does not disclose the apparatus limitations of the present claims and it also does not disclose the specific alloy compositions within the scope of the present claims. However, in Table 1, alloy compositions 1 and 8 are closest to the present invention with the exception that the silicon content is outside of the scope of the present claims. The alloys of the present invention closest to alloys 1 and 8 of JP '353 are alloys B and F in Table 1. The process to T6 temper for the extruded alloys were as follows, JP '353: extrusion (round bar) - solution treatment (500°C × 2 hours) - water quenching - T6 (170°C × 6 hours). The present invention: extrusion (rectangular shaped solid bar) - solution treatment (540°C) - water quenching - T6 (175°C × 8 hours).

	Alloy No.		Alloy No.	
	B	1	F	8
Tensile strength	460MPa	35kg/mm2 (343MPa)	480MPa	40kg/mm2 (392MPa)
Yield strength	420MPa	32kg/mm2 (314MPa)	425MPa	35kg/mm2 (343MPa)

As shown in the above Table, the alloys of the present invention have unexpectedly higher tensile and yield strengths than the alloys of JP '353. This is clearly unexpected in light of the disclosure of JP '353 and establishes the patentability of the presently claimed invention thereover.

JP '255 discloses a member for an automobile brake made from a billet of a specified aluminum alloy composition. This reference was cited by the Examiner as disclosing substantially similar extrusion apparatus parameters as that of the present invention including a bearing length of a solid die L approximately = T. However, the applicant was unable to read L being approximately = T from the diagrams of this reference. Though the diameter of the billet 31 in Figure 2 is not described, it would be 200 mm or so, if it has the same

diameter as the outer diameter of the flow guide 23 in Figure 4. The size of the extruded product 32 is 100 mm × 50 mm and the ratio of the size between the billet and the extruded product is 200:50 ~ 100 = 1:0.25 ~ 0.5. However, the ratio cannot be read in the diagrams because the diagrams are schematic and not drawn to scale. Therefore, the Examiner's assumption regarding this reference is incorrect and, even if it were correct, given the unexpectedly higher tensile and yield strengths associated with the present invention, the presently claimed invention still would be patentably distinguishable over the combination of JP '353 with JP '255.

JP '329 discloses a die for extruding an aluminum alloy which manufactures extruded shapes, such as bends and corrugations, without defects by averaging metal flow-out speed on the outlet side of the die, even when the shapes have a large thickness difference and are wide. This reference also has been cited by the Examiner as disclosing apparatus limitations similar to those of the present claims. That is, the Examiner has pointed out that JP '329 teaches a flow guide and that the thickness of the billet D = Wf = 175 mm, thickness of the extrusion T = wb = 1.4 ~ 2.5 mm and because Wf - Wv = A, then A = 86.25 ~ 86.8 mm, which means the instant limitation of A is ≥ 5 mm. Applicants respectfully disagree with the Examiner.

D is not the same as Wf but D ≥ Wf. The calculation is made by using the value of Wf and Wb described in Table 1. According to this calculation, A = (Wf - Wb) / 2 = 4.05 ~ 8.05 mm. In contrast thereto, in Claim 2, A is restricted to from 9-15 mm. If the distance A is too small, the degree of working inside the guide hole 5 becomes excessively high which causes recrystallization to occur in the surface layer of the extruded product and a high strength cannot be obtained as seen in the comparison between specimen Nos. 35 and 36. Additionally, in this reference the extrusion of a 6063 alloy with copper of 0.1% or less is only illustrated and this reference does not teach the extrusion of an aluminum-

magnesium-silicon-copper alloy with an increased copper content of 1.7 to 2.5% as required in the present invention. Therefore, JP '329 in combination with JP '353 does not present a showing of prima facie obviousness with respect to the presently claimed invention and, moreover, given the superior properties associated with the presently claimed invention, any proper showing of prima facie obviousness would be rebutted.

The Examiner is respectfully requested to reconsider the present application and to pass it to issue.

Respectfully submitted,

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